FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
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PROJECT TITLE: Effects of oil field development on calf production and survival in the Central Arctic Herd

PRINCIPAL INVESTIGATORS: Stephen M. Arthur and Patricia Del Vecchio

COOPERATORS: ConocoPhillips Alaska, Inc.; US Bureau of Land Management; US National Park Service; and US Fish and Wildlife Service.

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR: W-33-2

PROJECT NR: 3.46

WORK LOCATION: Game Management Unit 26B

STATE: Alaska

PERIOD: 1 July 2003–30 June 2004

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Estimate annual pregnancy and birth rates of caribou cows.

Pregnancy and birth rates were assessed by locating radiocollared cows annually during early June 2001–2004.

OBJECTIVE 2: Estimate survival of female calves to yearling age class and determine causes of mortality.

Calves were captured and radiocollared during June 2001, 2002, 2003 and 2004. Calves were monitored at approximately 2-week intervals during June–October, then located again in March and June of the following years to estimate survival rates.

OBJECTIVE 3: Estimate rates of growth and weight gain by calves during summer.

Radiocollared calves were recaptured during September and March of each year, weighed and measured to assess growth rates.

OBJECTIVE 4: Assess changes in location, physiography, and vegetation of calving sites among years.

Location and vegetation types were recorded and photographed at initial capture sites of calves. These data will be analyzed to detect changes in location and habitat use that may occur over time.

OBJECTIVE 5: Monitor movements of caribou to determine winter and summer distributions.

Radiocollared calves were located at 2-week intervals during June–September. In addition, radiocollared cows were located during late February and early March, 2002–2004 to record winter concentration areas.

OBJECTIVE 6: Estimate size of the herd at 2–year intervals using a complete aerial photocensus.

An aerial photocensus was conducted during July 2002. The herd was estimated at 31,857 caribou.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1: Estimate annual pregnancy and birth rates of caribou cows.

Radiotracking surveys were conducted on 1–11 June 2004 to determine the proportion of cows that gave birth and the distribution of cows during the calving period. Seventy-seven radiocollared adult (≥3 years old) cows were located during this period. Fifty-six calves were observed, and 13 cows were judged to be pregnant based on presence of antlers and distended udders. Thus, parturition rate was 89%.

JOB 2: Estimate survival of female calves to yearling age class and determine causes of mortality.

Sixty-one neonatal calves were captured and radiocollared from June 1 to June 8 2003. Thirty calves were captured in the eastern and 31 in the western calving areas and included 16 calves (5 female, 11 male) of GPS-collared cows and 45 female calves of uncollared cows. One calf died soon after birth due to a malformed lung. This calf was not included in subsequent analyses. Between 9 June and 6 September, 6 additional calves died, all due to predation. Three more calves died in October, probably as a result of predation. Three calves died as a result of injuries sustained during captures (2 during September and 1 during March), and will be excluded from subsequent survival analyses. Kaplan–Meier estimates of calf survival from capture through 7 September were 0.86 (95% CI = 0.74, 0.99), and 0.93 (95% CI = 0.91, 1.00) for calves captured in the eastern and western areas, respectively. Survival through the age of 1 year was 0.81 (0.87, 01.0) and 0.82 (0.79, 1.0) for eastern and western areas. Sixty-three additional calves were captured during 1–11 June 2004 and will be monitored during FY05. These included 40 calves (24 female, 16 male) of GPS-collared cows and 23 female calves of uncollared cows.

JOB 3: Estimate rates of growth and weight gain by calves during summer.

Weights and metatarsus lengths were recorded for all 61 calves captured in June, 2003. However, 1 calf captured in the western area appeared to be >2 days old, based on the

absence of an umbilicus, general appearance, and running ability. This calf was weighed and measured but these data were not used to determine means for these measurements at birth (however, this calf was included in the determination of mean weight gain and growth between early Jun and early Sep). Mean weights of the remaining calves were 6.7 and 6.4 kg, respectively, for the eastern and western areas. Mean metatarsus lengths were 26.1 and 25.3 cm for the eastern and western areas. There were no differences in neonatal weight or metatarsus length between sexes. A second capture effort was conducted 9–12 September, 2003. Of the 55 calves thought to have survived until then, 46 were found and captured by net gun, weighed and measured (23 from the eastern calving area, 23 from the western). Mean weight gain was 33.31 kg and 32.85 kg for calves born in the eastern and western areas. Mean metatarsus lengths were 45.78 cm and 40.78 cm for the eastern and western areas, respectively.

Using funds provided by the US Bureau of Land Management, 26 GPS-equipped collars were purchased. These were deployed on caribou cows during March 2004 to augment similar collars deployed during 2003. We will use these collars to assess calf growth rates based on detailed data on summer movements and exposure to disturbance (see Section V). In addition, with funding provided by the US National Park Service, 64 cows and 48 calves were located on winter range during March 2004. Twenty-three of the collared calves were captured and weighed during March.

JOB 4: Assess changes in location, physiography, and vegetation of calving sites among years.

Locations of captures were assumed to indicate birth location, because captured calves exhibited physical and behavioral traits characteristic of newborn caribou (lack of coordination, small size, appearance of umbilicus, hooves, posture), and because caribou usually do not travel far during the first week following birth of calves. These locations were mapped and will be compared to similar data during each year of the study. Vegetation at each site was classified and photographed for future, more detailed analysis.

JOB 5: Monitor movements of caribou to determine winter and summer distributions.

Collared calves were located by aerial radiotracking at approximately 2-week intervals from June through October. Distributions of collared calves were recorded and mapped using fixed kernel utilization distribution models encompassing 50% and 99% of the utilization distributions. Summer distributions of calves caught in the 2 areas overlapped, and calves occasionally switched sides, but some degree of fidelity to each side was evident. Calves from both calving areas used western portions of the Arctic National Wildlife Refuge during late summer and fall. Proportions of collared calves that were within the refuge ranged from 0 during June to 70% (n = 47) on 16 March. Calves were monitored until the end of September, which allowed us to document their migration and arrival at their wintering grounds, and then located again in March, 2004.

JOB 6: Estimate size of the herd at 2–year intervals using a complete aerial photocensus.

No photo census was planned for this period. The next photo census is scheduled to occur during FY 2005.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

IV. PUBLICATIONS

None.

V. RECOMMENDATIONS FOR THIS PROJECT

Fieldwork is scheduled to continue until 2005. In addition, we have proposed expanding this study to use detailed data on caribou movements to develop spatially explicit models of caribou exposure to anthropogenic disturbance. In addition to demographic and physiological data, we will collect detailed data on spring, summer, and fall movements and exposure of caribou to industrial activity to investigate the influence of oil field development on caribou population dynamics. Objectives of this expanded study would be to:

1 Estimate annual rates of calf production, survival, and growth.

2 Determine distributions of pregnant caribou cows during the calving period each year.

3 Monitor movements of cow–calf pairs every 5 hours during spring, summer, and fall.

4 Examine the relationships among demographic parameters (Objective 1) and birth location, habitat characteristics, and movements, and exposure to human activity.

5 Investigate the potential for human activities to influence caribou movements during late summer and fall.

6 Document distribution of CAH caribou throughout the year.

The US Bureau of Land Management has committed significant funding to this project and we are currently attempting to obtain the remaining required funds.

VI. APPENDIX

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $77,300 + STATE SHARE $25,800 = TOTAL $103,100

Additional project expenses totaling $165.1 were paid using non-Federal Aid funds (provided by U.S. Bureau of Land Management).

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